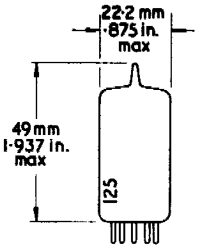
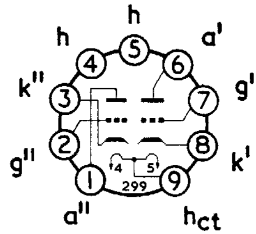


HIGH μ DOUBLE TRIODE



B9A Base

GENERAL

This valve is primarily intended for use as a resistance coupled amplifier or phase inverter. The heater is centre tapped and the sections may be operated in series or in parallel on A.C. or A.C./D.C. mains.

Heater Voltage	V_h	6·3	or	12·6	V
Heater Current	I_h	0·3		0·15	A

RATINGS (Each Section)

Maximum Anode Dissipation	$p_{a(max)}$	1·0	W
Maximum Anode Voltage	$V_{a(max)}$	300	V
Maximum Heater to Cathode Voltage (D.C. or R.M.S.)	$V_{h\text{-}k(max)}$	180	V
Maximum Cathode Current	$I_{k(max)}$	8	mA
Maximum Grid to Cathode Resistance (Fixed Bias)	$R_{g\text{-}k(max)}$	1·0	MΩ

INTER-ELECTRODE CAPACITANCES

		*	†	‡	
Input′	c_{in}'	1·6	1·8	2·6	pF
Input″	c_{in}''	1·6	1·8	2·5	pF
Output′	c_{out}'	0·33	0·48	1·3	pF
Output″	c_{out}''	0·23	0·34	1·1	pF
Anode′ to Grid′	$c_{a'\text{-}g'}$	1·6	1·7	2·0	pF
Anode″ to Grid″	$c_{a''\text{-}g''}$	1·6	1·8	2·1	pF
Anode′ to Anode″	$c_{a'\text{-}a''}$	0·9	0·95	0·95	pF
Grid′ to Grid″	$c_{g'\text{-}g''}$	0·008	0·012	0·014	pF
Anode′ to Grid″	$c_{a'\text{-}g''}$	<0·1	<0·1	<0·15	pF
Anode″ to Grid′	$c_{a''\text{-}g'}$	<0·1	<0·1	<0·15	pF
Grid′ to Heater	$c_{g'\text{-}h}$	0·1	0·21	0·28	pF
Grid″ to Heater	$c_{g''\text{-}h}$	0·08	0·18	0·23	pF

* In fully shielded socket, without can (I.E.C. Publication 100).
† With holder capacitance balanced out (Holder as below).
‡ Total capacitance including unskirted nylon phenolic B9A holder (AEI type VH19/902).

CHARACTERISTICS (Each Section)

Anode Voltage	V_a	100	250	V
Anode Current	I_a	0·5	1·2	mA
Grid Voltage	V_g	−1·0	−2·0	V
Mutual Conductance	g_m	1·25	1·6	mA/V
Valve Anode Resistance ($\delta v_a/\delta i_a$)	r_a	80	62·5	kΩ
Amplification Factor	μ	100	100	

When the two sections are used in cascade the section connected to pins 6, 7 and 8 should be used as the first stage for best hum performance. The heater voltage should be applied between pin 9 and pins 4 and 5 connected together and the centre tap of the heater transformer earthed.

MOUNTING POSITION—Unrestricted

THORN—AEI RADIO VALVES & TUBES LTD.

TYPICAL OPERATION

Conditions as resistance coupled A.F. Amplifier.

Cathode Self Bias†

Supply Voltage	V_b	250	300	350	400	250	300	350	400	250	300	350	400	V
Anode Load Resistance	R_a	47	47	47	47	100	100	100	100	220	220	220	220	kΩ
Cathode Self Bias Resistance	R_k	2·2	1·5	1·2	1·0	3·3	2·2	1·8	1·5	4·7	3·9	2·7	2·2	kΩ
Grid Resistance of Following Valve		150	150	150	150	330	330	330	330	680	680	680	680	kΩ
Anode Current	I_a	0·9	1·3	1·7	2·2	0·6	0·88	1·1	1·4	0·38	0·5	0·7	0·88	mA
Voltage Amplification		36	40	42	43	50	55	57	59	62	65	69	71	
R.M.S. Output Voltage for 5% total distortion*		12·5	22	31	40·5	18·5	32·5	45	59	27	38·5	60	63§	V

Grid Current Bias (R_g = 10 MΩ)

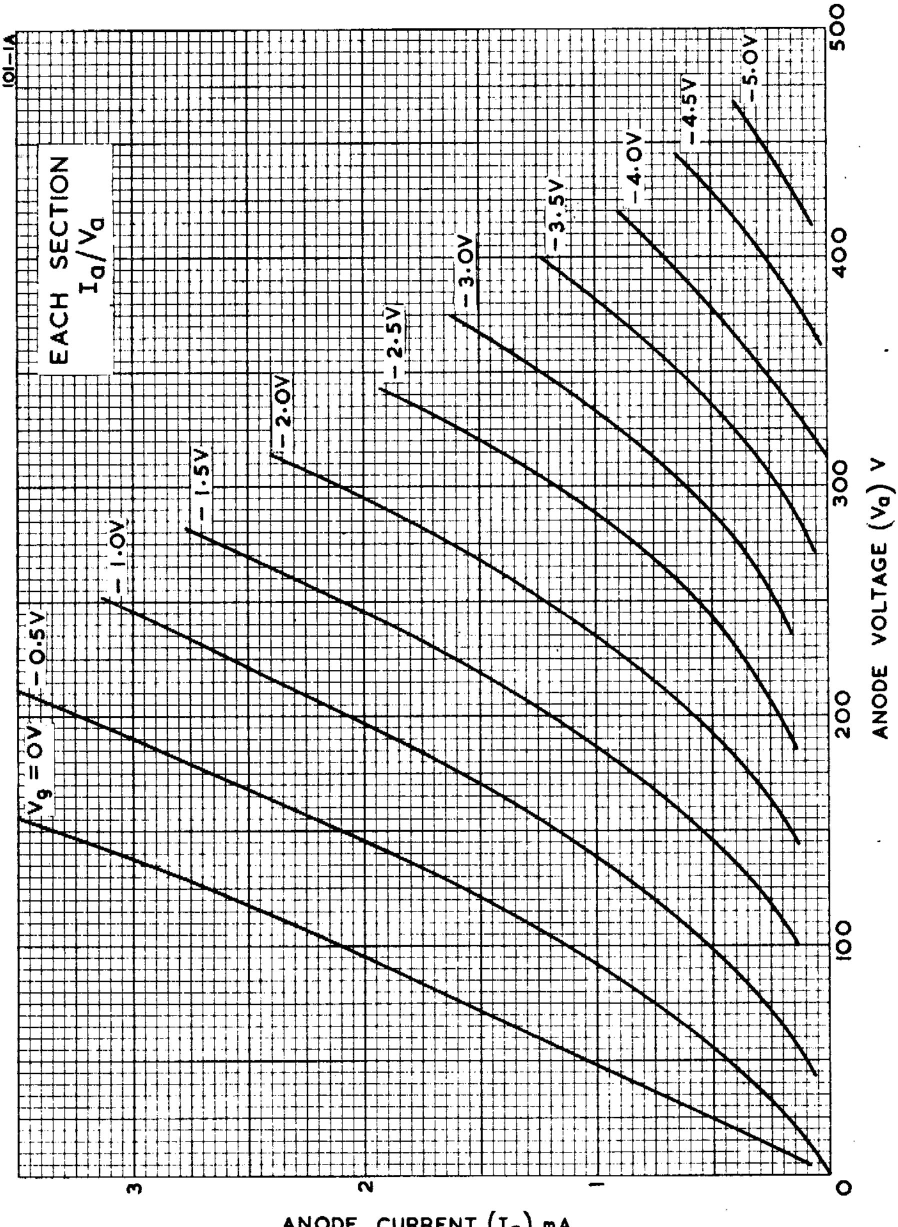
Supply Voltage	V_b	200	250	300	350	400	200	250	300	350	400	200	250	300	350	400	V
Anode Load Resistance	R_a	47	47	47	47	47	100	100	100	100	100	220	220	220	220	220	kΩ
Grid Resistance of Following Valve		150	150	150	150	150	330	330	330	330	330	680	680	680	680	680	kΩ
Anode Current	I_a	1·2	1·7	2·2	2·8	3·5	0·8	1·1	1·4	1·7	2·1	0·4	0·6	0·8	1·0	1·2	mA
Signal source impedance Z_s = 0Ω																	
Voltage Amplification for V_{in}(r.m.s.) = 100 mV		40	43	45	46	48	56	59	61	62	63	66	70	72	74	75	
R.M.S. Output Voltage for 5% total distortion		14	21	28	35	43	20	29	38	48	58	24	34	45	57	69	V
Signal source impedance Z_s = 220 kΩ																	
Voltage Amplification for V_{in}(r.m.s.) = 100 mV		30	31	32	33	33	39	41	41	42	42	44	46	47	48	49	
R.M.S. Output Voltage for 5% total distortion‡		17	25	33	41	49	25	36	46	57	68	32	44	57	70	82	V

† At lower values of supply voltage grid current bias should be used.

* At lower output voltages the distortion is approximately proportional to the output voltage.

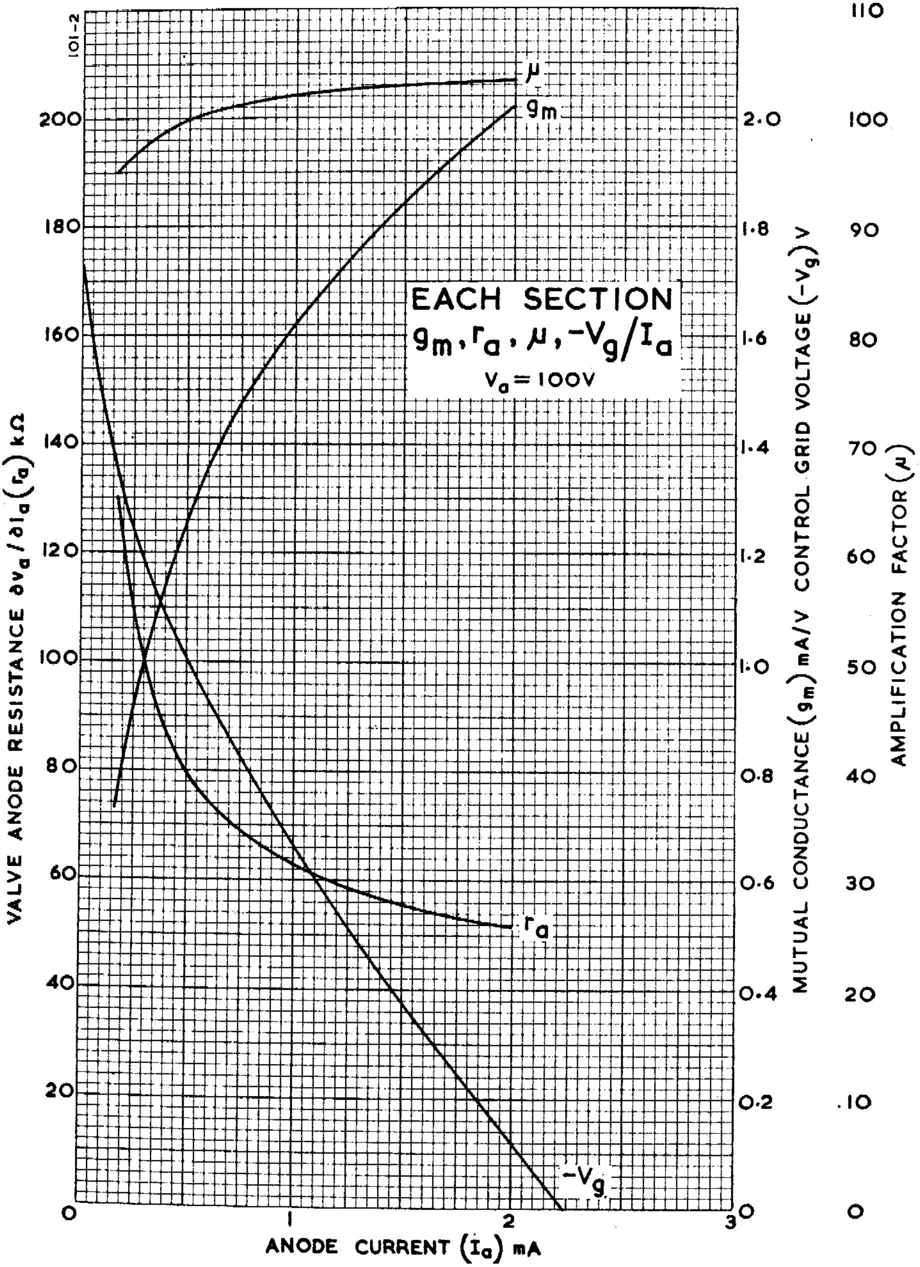
§ For start of positive grid current. Total distortion = 3·7%.

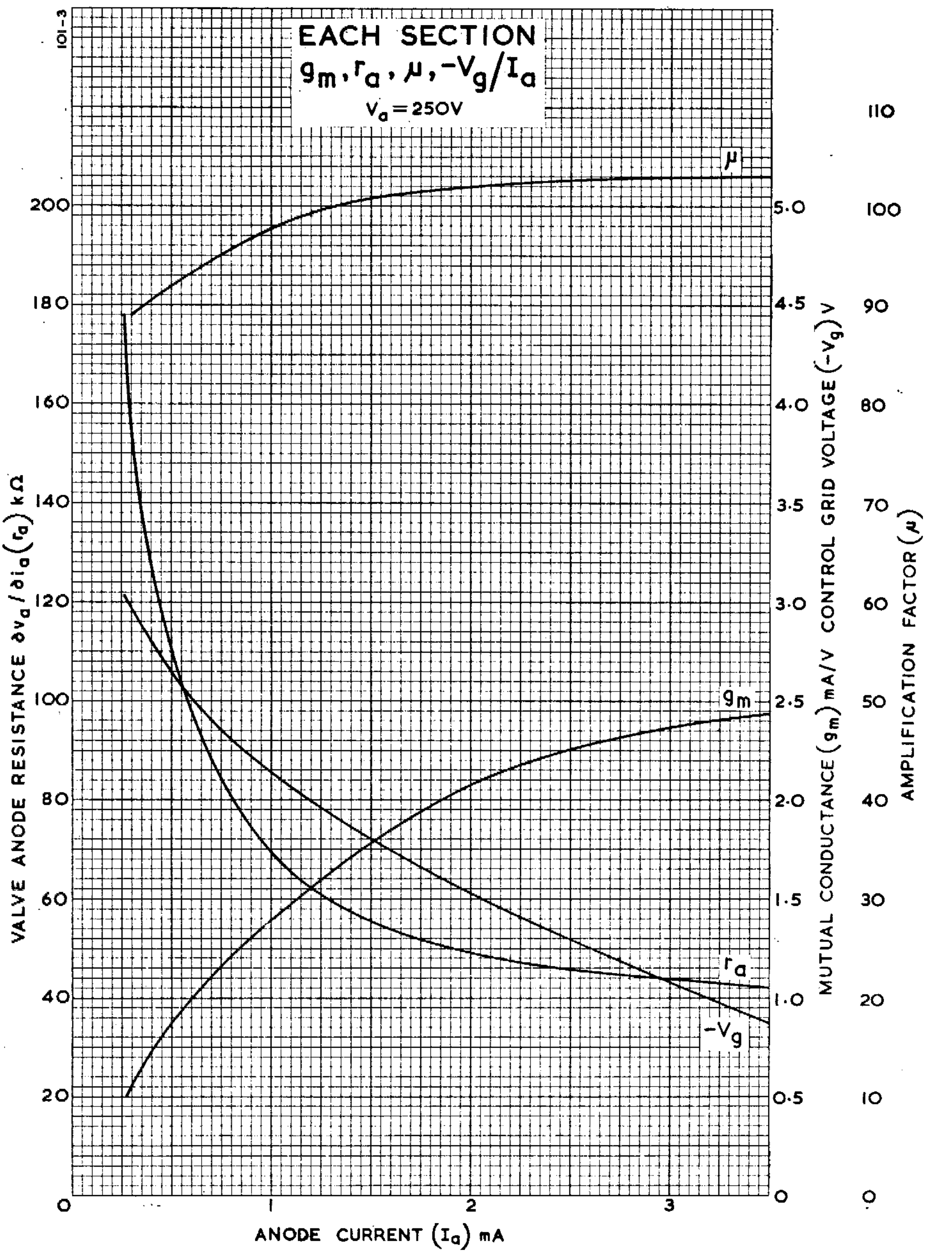
‡ When operating this valve with grid current bias and a high source impedance, the second harmonic distortion rises to a peak at quite low levels of output (about 10 V r.m.s.) and then falls with increasing drive. The third harmonic then begins to rise, and D_{tot} finally reaches 5% at a much higher output level than with zero source impedance. The maximum value of this distortion peak varies inversely with the anode load, being about 5·5% with R_a = 47 kΩ, 4·5% with R_a = 100 kΩ and 4% with R_a = 220 kΩ.


101-1A
EACH SECTION
I_a/V_a
V_g = 0V
− 0.5V
− 1.0V
− 1.5V
− 2.0V
− 2.5V
− 3.0V
− 3.5V
− 4.0V
− 4.5V
− 5.0V
ANODE VOLTAGE (V_a) V
0
100
200
300
400
500
ANODE CURRENT (I_a) mA
1
2
3

VALVES

MAZDA





101-3
EACH SECTION
$g_m, r_a, \mu, -V_g/I_a$
$V_a = 250V$
μ
g_m
r_a
$-V_g$
VALVE ANODE RESISTANCE $\partial v_a / \partial i_a (r_a)$ kΩ
MUTUAL CONDUCTANCE (g_m) mA/V CONTROL GRID VOLTAGE $(-V_g)$ V
AMPLIFICATION FACTOR (μ)
ANODE CURRENT (I_a) mA
0
1
2
3
20
40
60
80
100
120
140
160
180
200
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
10
30
50
70
90
110